AMENDMENT

In the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the instant application:

Claims 1-37. (Cancelled)

Claim 38. (Previously Presented): A method for determining the susceptibility of an at least partially atrophied thymus to reactivation in a patient, comprising:

monitoring the level in the patient's blood or serum of a marker associated with activation of the thymus;

monitoring the level in the patient's blood of newly produced T cells by monitoring T Cell Receptor Excision Circles (TRECs);

disrupting sex steroid-mediated signaling to the thymus of the patient;

monitoring the level in the patient's blood or serum of the marker and the TRECs; and

comparing the level of the marker and the level of the TRECs before and after disruption of sex steroid-mediated signaling,

wherein an increase in the level of the marker and in the level of TRECs following disruption of sex steroid-mediated signaling compared with the level of the marker and the level of TRECs prior to disruption of sex steroid-mediated signaling indicates susceptibility of the patient's thymus to reactivation.

Claim 39. (Previously Presented): The method of claim 38, wherein the patient has a disease that at least in part atrophied the thymus of the patient.

Claim 40. (Previously Presented): The method of claim 38, wherein the patient has had a treatment of a disease, wherein the treatment at least in part atrophied the thymus of the patient.

Claim 41. (Previously Presented): The method of claim 40, wherein the treatment is immunosuppression, chemotherapy, or radiation treatment.

Claim 42. (Previously Presented): The method of claim 38, wherein the patient is post-pubertal.

Claim 43. (Withdrawn): The method of claim 38, wherein the sex steroid-mediated signaling to the thymus is disrupted by surgical castration.

Claim 44. (Previously Presented): The method of claim 38, wherein the sex steroid-mediated signaling to the thymus is disrupted by chemical castration.

Claim 45. (Cancelled)

Claim 46. (Currently Amended): The method of ~~claim 45~~ claim 44, wherein the chemical castration is performed by administration of a pharmaceutical [[is]] selected from the group consisting of LHRH agonists, LHRH antagonists, anti-LHRH vaccines, anti-androgens, anti-estrogens, SERMs, SARMs, SPRMs, ERDs, aromatase inhibitors, anti-progestogens, Dioxalan derivatives, and combinations thereof.

Claim 47. (Previously Presented): The method of claim 46, wherein the LHRH agonists are selected from the group consisting of Goserelin, Leuprolide, LUPRON™, Triptorelin, Meterelin, Buserelin, Histrelin, Nafarelin, Lutrelin, Leuprorelin, Deslorelin, CYSTORELIN™, DECAPEPTYLY™, Gonadorelin, and combinations thereof.

Claim 48. (Previously Presented): The method of claim 46, wherein the LHRH antagonists are selected from the group consisting of Abarelix, Cetrorelix, and combinations thereof.

Claim 49. (Previously Presented): The method of claim 46, wherein the pharmaceutical is a combination of a LHRH agonist and a LHRH antagonist.

Claim 50. (Previously Presented): The method of claim 38, wherein the increase occurs within four weeks following disruption of sex steroid-mediated signaling.

Claim 51. (Previously Presented): The method of claim 38, wherein the increase occurs within two weeks following disruption of sex steroid-mediated signaling.

Claim 52. (Previously Presented): The method of claim 38, wherein the increase occurs within one week following disruption of sex steroid-mediated signaling.

Claim 53. (Previously Presented): The method of claim 38, wherein the increase occurs within about 4 to 5 days following disruption of sex steroid-mediated signaling.

Claim 54. (Previously Presented): The method of claim 38, wherein the increase occurs within about 2 to 3 days following disruption of sex steroid-mediated signaling.

Claim 55. (Previously Presented): The method of claim 38, wherein the increase occurs within about 24 hours following disruption of sex steroid-mediated signaling.

Claim 56. (Previously Presented): The method of claim 38, wherein the marker is a thymopoietic hormone or thymopoietic cytokine.

Claim 57. (Previously Presented): The method of claim 56, wherein the marker is selected from the group consisting of IL-7, Factor Thymique Serique (FTS), thymulin, thymosin, thymosin-alpha 1, thymosin-beta 4, thymopoietin, CXCL12, CCL19, CCL21, CCL22, CCL25, a member of the keratinocyte growth factor (KGF) family, a member of the fibroblast growth factor (FGF) family and any combination thereof.

Claims 58-60. (Cancelled)

Claim 61. (Withdrawn): A method for determining the susceptibility of an at least partially atrophied thymus to reactivation in a patient, comprising:

monitoring the *in vitro* proliferative responsiveness of T cells in the patient's blood;

disrupting sex steroid-mediated signaling to the thymus of the patient;

monitoring the *in vitro* proliferative responsiveness of the T cells in the patient's blood; and

comparing the *in vitro* proliferative responsiveness of the T cells in the patient's blood before and after disruption of sex steroid-mediated signaling to the thymus of the patient,

wherein an early increase in the *in vitro* proliferative responsiveness of the T cells following disruption of sex steroid-mediated signaling indicates susceptibility of the patient's thymus to reactivation.

Claim 62. (Withdrawn): A method for determining the susceptibility of an at least partially atrophied thymus to reactivation in a patient, comprising:

monitoring the level of newly produced T cells in the patient's blood;

disrupting sex steroid-mediated signaling to the thymus of the patient;

monitoring the level of newly produced T cells in the patient's blood; and

comparing the level of the newly produced T cells in the patient's blood before and after disruption of sex steroid-mediated signaling,

wherein an early increase in the level of the newly produced T cells following disruption of sex steroid-mediated signaling indicates susceptibility of the patient's thymus to reactivation.

Claim 63. (Withdrawn): The method of claim 62, wherein the monitoring of the level of newly produced T cells is accomplished by monitoring a marker selected from the group consisting of Ki67, CD62L, CD45RA, CD69, LFA-1, VCAM, ICAM-1, VLA-4 and any combinations thereof.

Claim 64. (Withdrawn): The method of claim 62, wherein the monitoring of the level of newly produced T cells is accomplished by monitoring T Cell Receptor Excision Circles (TRECs).

Claim 65. (Cancelled)

Claim 66. (Withdrawn): The method of claim 64, wherein the TREC levels are monitored by a method comprising:

purifying the patient's T cells;

isolating DNA from the purified T cells; and

performing real-time polymerase chain reaction on the isolated DNA with TREC-specific primers and a molecular beacon,

wherein the primers amplify the TREC DNA, and wherein the molecular beacon detects the amplified TREC DNA.

Claim 67. (Withdrawn): The method of claim 66, wherein the TREC-specific primers are selected from the group consisting of SEQ ID NO:1, SEQ ID. NO:2, SEQ ID NO:3, and SEQ ID NO:4.

Claim 68. (Withdrawn): The method of claim 64, wherein the patient has a disease that at least in part atrophied the thymus of the patient.

Claim 69. (Withdrawn): The method of claim 64, wherein the patient has had a treatment of a disease, wherein the treatment at least in part atrophied the thymus of the patient.

Claim 70. (Withdrawn): The method of claim 69, wherein the treatment is immunosuppression, chemotherapy, or radiation treatment.

Claim 71. (Withdrawn): The method of claim 64, wherein the patient is post-pubertal.

Claim 72. (Withdrawn): The method of claim 64, wherein the sex steroid-mediated signaling to the thymus is disrupted by surgical castration.

Claim 73. (Withdrawn): The method of claim 64, wherein the sex steroid-mediated signaling to the thymus is disrupted by chemical castration.

Claim 74. (Withdrawn): The method of claim 64, wherein the sex steroid-mediated signaling to the thymus is disrupted by administration of a pharmaceutical.

Claim 75. (Withdrawn): The method of claim 74, wherein the pharmaceutical is selected from the group consisting of LHRH agonists, LHRH antagonists, anti-LHRH vaccines, anti-androgens, anti-estrogens, SERMs, SARMs, SPRMs, ERDs, aromatase inhibitors, anti-progestogens, Dioxalan derivatives, and combinations thereof.

Claim 76. (Withdrawn): The method of claim 75, wherein the LHRH agonists are selected from the group consisting of Goserelin, Leuprolide, LUPRON™, Triptorelin, Meterelin, Buserelin, Histrelin, Nafarelin, Lutrelin, Leuprorelin, Deslorelin, CYSTORELIN™, DECAPEPTYLY™, Gonadorelin, and combinations thereof.

Claim 77. (Withdrawn): The method of claim 75, wherein the LHRH antagonists are selected from the group consisting of Abarelix, Cetrorelix, and combinations thereof.

Claim 78. (Withdrawn): The method of claim 74, wherein the pharmaceutical is a combination of a LHRH agonist and a LHRH antagonist.

Claim 79. (Withdrawn): The method of claim 65, wherein the early increase occurs within four weeks following disruption of sex steroid-mediated signaling.

Claim 80. (Withdrawn): The method of claim 65, wherein the early increase occurs within two weeks following disruption of sex steroid-mediated signaling.

Claim 81. (Withdrawn): The method of claim 65, wherein the early increase occurs within one week following disruption of sex steroid-mediated signaling.

Claim 82. (Withdrawn): The method of claim 65, wherein the early increase occurs within about 4 to 5 days following disruption of sex steroid-mediated signaling.

Claim 83. (Withdrawn): The method of claim 65, wherein the early increase occurs within about 2 to 3 days following disruption of sex steroid-mediated signaling.

Claim 84. (Withdrawn): The method of claim 65, wherein the early increase occurs within about 24 hours following disruption of sex steroid-mediated signaling.

Claims 85-88. (Cancelled)

Claim 89. (Previously Presented): A method for determining the susceptibility of an at least partially atrophied thymus to reactivation in a patient, comprising:

disrupting sex steroid-mediated signaling to the thymus of the patient;

monitoring the level in the patient's blood or serum of a marker associated with activation of the thymus; and

monitoring the level in the patient's blood of newly produced T cells by monitoring T Cell Receptor Excision Circles (TRECs),

wherein an increase in the level of the marker and in the level of the TRECs following disruption of sex steroid-mediated signaling compared with the level of the marker and the level of the TRECs prior to disruption of sex steroid-mediated signaling indicates susceptibility of the patient's thymus to reactivation.

Claim 90. (Withdrawn): A method for determining the susceptibility of an at least partially atrophied thymus to reactivation in a patient, comprising:

disrupting sex steroid-mediated signaling to the thymus of the patient; and

monitoring the *in vitro* proliferative responsiveness of the T cells in the patient's blood,

wherein an early increase in the *in vitro* proliferative responsiveness of the T cells following disruption of sex steroid-mediated signaling indicates susceptibility of the patient's thymus to reactivation.

Claim 91. (Cancelled)

Claim 92. (Withdrawn): A method for determining the susceptibility of an at least partially atrophied thymus to reactivation in a patient, comprising:

disrupting sex steroid-mediated signaling to the thymus of the patient; and

monitoring the level of newly produced T cells in the patient's blood,

wherein an early increase in the level of the newly produced T cells following disruption of sex steroid-mediated signaling indicates susceptibility of the patient's thymus to reactivation.

Claim 93. (Cancelled)

Claim 94. (Withdrawn): A method for determining the susceptibility of an at least partially atrophied thymus to reactivation in a patient, comprising:

disrupting sex steroid-mediated signaling to the thymus of the patient; and

monitoring the intracellular cytokine levels in the T cells in the patient's blood,

wherein an early increase in the intracellular cytokine levels in the T cells following disruption of sex steroid-mediated signaling indicates susceptibility of the patient's thymus to reactivation.

Claim 95. (Withdrawn): A method for determining the susceptibility of an at least partially atrophied thymus to reactivation in a patient, comprising:

monitoring the intracellular cytokine levels in the T cells in the patient's blood;

disrupting sex steroid-mediated signaling to the thymus of the patient;

monitoring the intracellular cytokine levels in the T cells in the patient's blood; and

comparing the intracellular cytokine levels in the T cells in the patient's blood before and after disruption of sex steroid-mediated signaling,

wherein an early increase in the intracellular cytokine levels in the T cells following disruption of sex steroid-mediated signaling indicates susceptibility of the patient's thymus to reactivation.

Claim 96. (Withdrawn): The method of claim 61, wherein the *in vitro* proliferative responsiveness of T cells in the patient's blood is determined by monitoring proliferation of T cells after anti-CD3 crosslinking.

Claim 97. (Withdrawn): The method of claim 90, wherein the *in vitro* proliferative responsiveness of T cells in the patient's blood is determined by monitoring proliferation of T cells after anti-CD3 crosslinking.

Claim 98. (Withdrawn): The method of claim 92, wherein the level of newly produced T cells in the patient's blood is determined by monitoring the level of the TRECs in the patient's blood.

Claim 99. (Previously Presented): The method of claim 38, wherein the sex steroid-mediated signaling to the thymus is disrupted by lowering the level of sex steroid hormones.

Claim 100. (Previously Presented): The method of claim 46 or 75, wherein the anti-androgen is EULEXIN™ or ketoconazole.